

AMENDMENTS TO THE CLAIMS

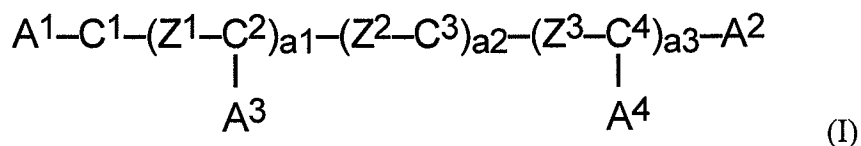
This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1-46. (canceled).

47. (currently amended): A mesogenic, cross-linkable mixture comprising:

- i) a cross-linkable liquid crystalline host comprising at least one cross-linkable liquid crystalline compound, and
- ii) at least one chiral or achiral rod shaped additive component, wherein the additive component is a compound of formula (I):



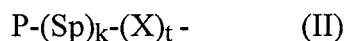
wherein:

C¹ to C⁴ are selected from optionally substituted cyclohexyl or cyclohexylene, phenyl or phenylene, naphthyl or naphthylene or phenanthryl or phenanthrylene;

connected to each other at the opposite positions via the bridging groups Z¹ to Z³;

wherein A¹ to A³ each independently represent hydrogen or a group represented by formula (II), and

wherein at least one of A¹ to A³ has the meaning of formula (II),



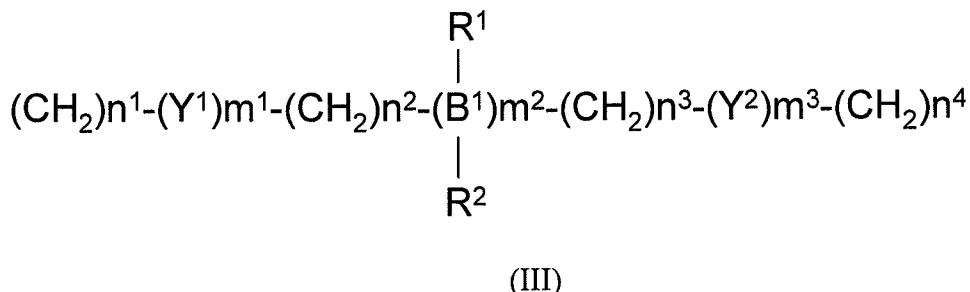
wherein:

P is hydrogen or a polymerizable group which is $\text{CH}_2=\text{CW}-$, $\text{CH}_2=\text{CW}-\text{O}-$,

$\text{CH}_2=\text{CW}-\text{COO}-$, wherein:

W is H or CH_3 ,

Sp has the meaning of formula (III)



wherein:

Y^1 and Y^2 each independently represent $-\text{OCO}-$ or $-\text{COO}-$,

B^1 represents C or CH,

R^1 and R^2 each independently represent hydrogen or a C_1 - C_{12} alkyl residue, preferably a C_1 - C_6 alkyl residue, which is a methyl, ethyl, propyl, butyl, pentyl, hexyl or isopropyl residue,

n^1 , n^2 , n^3 and n^4 are independently integers from 0 to 15,

such that $1 \leq n^1 + n^2 + n^3 + n^4 \leq 15$;

with the proviso that

if m^1 is 1 then n^1 , n^2 are independently integers from 1 to 15,

if m^3 is 1 then n^3 , n^4 are independently integers from 1 to 15;

m^1 , m^2 and m^3 are independently integers from 0 to 3, such that

$1 \leq m^1 + m^2 + m^3 \leq 3$ and wherein:

one or more $-\text{CH}_2-$ groups present in the hydrocarbon chain of (III) may be replaced, independently, by one or more groups selected from $-\text{O}-$, $-\text{CH}=\text{CH}-$ or $-\text{C}\equiv\text{C}-$,

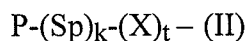
with the proviso that the carbon-carbon double bond of P is not directly connected to the carbon atom of Y^1 or Y^2 ,

k is 1,

X is $-\text{O}-$, $-\text{CO}-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{CH}=\text{CH}-$, $-\text{C}\equiv\text{C}-$, or a single bond, more preferably $-\text{O}-$, $-\text{COO}-$, $-\text{OCO}-$ or a single bond,

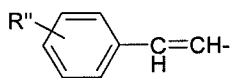
t is 1;

A^4 is hydrogen, a polar group which is cyano, nitro, a halogen, or a group of formula (II)



in which:

P is hydrogen or a polymerizable group which is $\text{CH}_2=\text{CW}-$, $\text{CH}_2=\text{CW}-\text{O}-$, $\text{CH}_2=\text{CW}-\text{COO}-$ or



wherein:

W is H, CH_3 , F, Cl, Br or I,

R'' is a C_{1-6} alkyl group, methoxy, cyano, F, Cl, Br or I,

Sp is a C_{1-22} branched or straight-chain alkylene group, in which one or more $-\text{CH}_2-$ groups present in the hydrocarbon chain may be replaced, independently, by one or more groups selected from $-\text{O}-$, $-\text{CH}(\text{OH})-$, $-\text{SO}_2-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{OCO}-\text{O}-$, $-\text{CH}=\text{CH}-$, $-\text{C}\equiv\text{C}-$, $-(\text{CF}_2)_r-$,

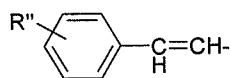
with the proviso that no two oxygen atoms are directly linked to each other, and
wherein r is an integer between 1 and 10,

k is 1,

X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond, more preferably -O-, -COO-, -OCO- or a single bond,

t is 1,

with the proviso that at least one of A^1 to A^4 comprises a polymerizable group which is $\text{CH}_2=\text{CW}-$, $\text{CH}_2=\text{CW}-\text{O}-$, $\text{CH}_2=\text{CW}-\text{COO}-$ or



wherein:

W is H, CH_3 , F, Cl, Br or I,

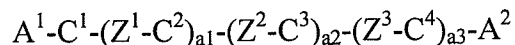
R'' is a C_{1-6} alkyl group, methoxy, cyano, F, Cl, Br or I;

Z^1 to Z^3 are independently from each other -CH(OH)-, -CO-, -CH₂(CO)-, -SO-, -CH₂(SO)-, -SO₂-, -CH₂(SO₂)-, -COO-, -OCO-, -COCF₂-, -CF₂CO-, -S-CO-, -CO-S-, -SOO-, -OSO-, -SOS-, -CH₂-CH₂-, -OCH₂-, -CH₂O-, -CH=CH-, -C≡C-, -CH=CH-COO-, -OCO-CH=CH-, -CH=N-, -C(CH₃)=N-, -N=N- or a single covalent bond,

a_1 , a_2 and a_3 are independently from each other integers from 0 to 3, such that

$$1 \leq a_1 + a_2 + a_3 \leq 3,$$

with the proviso that the sequence:



describes the long molecular axis of the rod shaped additive components

and wherein the additive component changes from the liquid crystalline state to the isotropic state at a temperature of 20 °C or lower.

48. (previously presented): A mixture according to claim 47, wherein the additive component has a transition temperature to the isotropic state of 0 °C or lower.

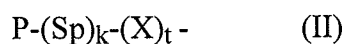
49. (previously presented): A mixture according to claim 47 having a clearing temperature of 30 °C or higher.

50. (previously presented): A mixture according to claim 47 having a clearing temperature of 50 °C or higher.

51. (previously presented): A mixture according to any one of claims 47-50, wherein the liquid crystalline host has a clearing temperature of 50 °C or higher.

52. (currently amended): A mixture according to claim 47, wherein A¹ to A³ each independently represent hydrogen or a group represented by formula (II), and

wherein at least one of A¹ to A³ has the meaning of formula (II),



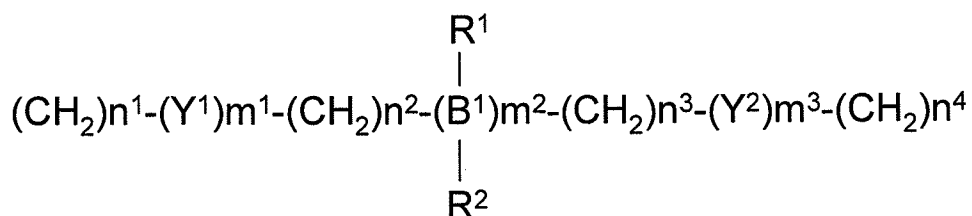
wherein:

P is hydrogen or a polymerizable group which is CH₂=CW-, CH₂=CW-O-,
CH₂=CW-COO-,

wherein:

W is H or CH₃,

Sp has the meaning of formula (III)



(III)

wherein:

Y^1 and Y^2 each independently represent -OCO- or -COO-,

B^1 represents C or CH,

R^1 is hydrogen

R^2 represents a methyl, ethyl, propyl, butyl, pentyl or hexyl group and most preferably a methyl or ethyl group,

n^1, n^2, n^3 and n^4 are independently integers from 0 to 15,

such that $1 \leq n^1 + n^2 + n^3 + n^4 \leq 15$;

with the proviso that

if m^1 is 1 then n^1, n^2 are independently integers from 1 to 15,

if m^3 is 1 then n^3, n^4 are independently integers from 1 to 15;

m^1, m^2 and m^3 are independently integers from 0 to 3 to 1,

such that $1 \leq m^1 + m^2 + m^3 \leq 3$; and wherein:

one or more -CH₂- groups present in the hydrocarbon chain of (III) may be replaced, independently, by one or more groups selected from -O-, -CH=CH- or -C≡C-,

with the proviso that the carbon-carbon double bond of P is not directly connected to the carbon atom of Y^1 or Y^2 ,

k is 1,

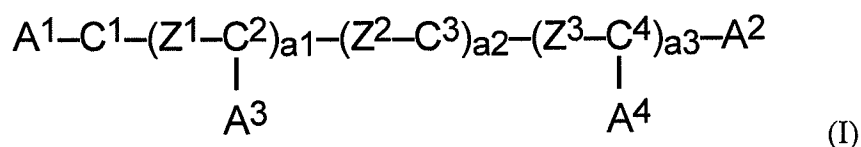
X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond, more preferably -O-, -COO-, -OCO- or a single bond,

t is 1.

53. (previously presented): A mixture according to claim 47 comprising further agents, such as cross-linking agents, stabilizing agents, initiators, dyes, other chiral or achiral additives and plasticizers.

54 (previously presented): A mixture according to claim 47 in form of an elastomer, polymer gel, polymer network or polymer film.

55. (currently amended): A chiral or achiral rod shaped compound, wherein said compound is of formula (I):



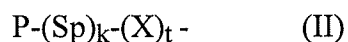
wherein:

C¹ to C⁴ are selected from optionally substituted cyclohexyl or cyclohexylene, phenyl or phenylene, naphthyl or naphthylene or phenanthryl or phenanthrylene;

connected to each other at the opposite positions via the bridging groups Z¹ to Z³;

wherein A¹ to A³ each independently represent hydrogen or a group represented by formula (II), and

wherein at least one of A¹ to A³ has the meaning of formula (II),



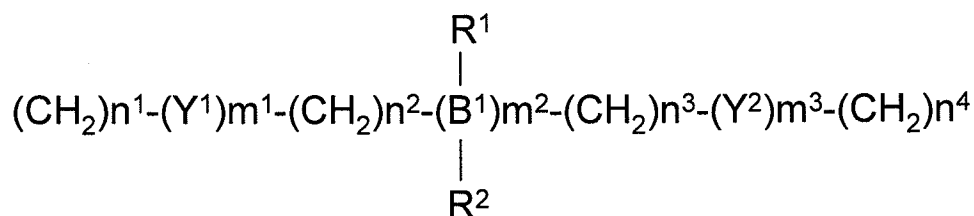
wherein:

P is hydrogen or a polymerizable group which is $\text{CH}_2=\text{CW}-$, $\text{CH}_2=\text{CW}-\text{O}-$,
 $\text{CH}_2=\text{CW}-\text{COO}-$,

wherein:

W is H or CH_3 ,

Sp has the meaning of formula (III)



(III)

wherein:

Y^1 and Y^2 each independently represent $-\text{OCO}-$ or $-\text{COO}-$,

B^1 represents C or CH,

R^1 and R^2 each independently represent hydrogen or a C_1 - C_{12} alkyl
residue, preferably a C_1 - C_6 alkyl residue, which is methyl, ethyl, propyl, butyl, pentyl, hexyl or
isopropyl residue,

n^1, n^2, n^3 and n^4 are independently integers from 0 to 15,

such that $1 \leq n^1 + n^2 + n^3 + n^4 \leq 15$;

with the proviso that

if m^1 is 1 then n^1, n^2 are independently integers from 1 to 15,

if m^3 is 1 then n^3, n^4 are independently integers from 1 to 15;

m^1, m^2 and m^3 are independently integers from 0 ~~to 3~~ to 1, such that

$1 \leq m^1 + m^2 + m^3 \leq 3$ and

wherein:

-one or more $\text{-CH}_2\text{-}$ groups present in the hydrocarbon chain of (III) may be replaced,

independently, by one or more groups selected from -O- , -CH=CH- or $\text{-C}\equiv\text{C-}$,

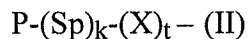
with the proviso that the carbon-carbon double bond of P is not directly connected to the carbon atom of Y^1 or Y^2 ,

k is 1,

X is -O- , -CO- , -COO- , -OCO- , -CH=CH- , $\text{-C}\equiv\text{C-}$, or a single bond, more preferably -O- , -COO- , -OCO- or a single bond,

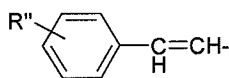
t is 1

A^4 is hydrogen, a polar group which is cyano, nitro, a halogen, or a group of formula (II)



in which:

P is hydrogen or a polymerizable group which is $\text{CH}_2=\text{CW-}$, $\text{CH}_2=\text{CW-O-}$, $\text{CH}_2=\text{CW-COO-}$ or



wherein:

W is H, CH_3 , F, Cl, Br or I,

R'' is a C_{1-6} alkyl group, methoxy, cyano, F, Cl, Br or I,

Sp is a C_{1-22} branched or straight-chain alkylene group, in which one or more $\text{-CH}_2\text{-}$ groups present in the hydrocarbon chain may be replaced, independently, by one

or more groups selected from -O-, -CH(OH)-, -SO₂-, -COO-, -OCO-, -OCO-O-, -CH=CH-,
-C≡C-, -(CF₂)_r - ,

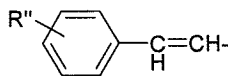
with the proviso that no two oxygen atoms are directly linked to each other, and
wherein r is an integer between 1 and 10,

k is 1,

X is -O-, -CO-, -COO-, -OCO-, -CH=CH-, -C≡C-, or a single bond, more
preferably -O-, -COO-, -OCO- or a single bond,

t is 1,

with the proviso that at least one of A¹ to A⁴ comprises a
polymerizable group which is CH₂=CW-, CH₂=CW-O-, CH₂=CW-COO- or



wherein:

W is H, CH₃, F, Cl, Br or I,

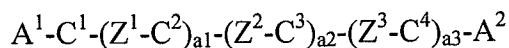
R'' is a C₁₋₆ alkyl group, methoxy, cyano, F, Cl, Br or I;

Z¹ to Z³ are independently from each other -CH(OH)-, -CO-, -CH₂(CO)-, -SO-,
-CH₂(SO)-, -SO₂-, -CH₂(SO₂)-, -COO-, -OCO-, -COCF₂-, -CF₂CO-, -S-CO-, -CO-S-, -SOO-,
-OSO-, -SOS-, -CH₂-CH₂-, -OCH₂-, -CH₂O-, -CH=CH-, -C≡C-, -CH=CH-COO-,
-OCO-CH=CH-, -CH=N-, -C(CH₃)=N-, -N=N- or a single covalent bond,

a₁, a₂ and a₃ are independently from each other integers from 0 to 3, such that

$$1 \leq a_1 + a_2 + a_3 \leq 3,$$

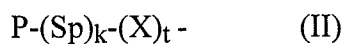
with the proviso that the sequence:



describes the long molecular axis of the rod shaped compound and has a transition temperature to the isotropic state of 20 °C or lower.

56. (currently amended): A compound according to claim 55, wherein A¹ to A³ each independently represent hydrogen or a group represented by formula (II), and

wherein at least one of A¹ to A³ has the meaning of formula (II),



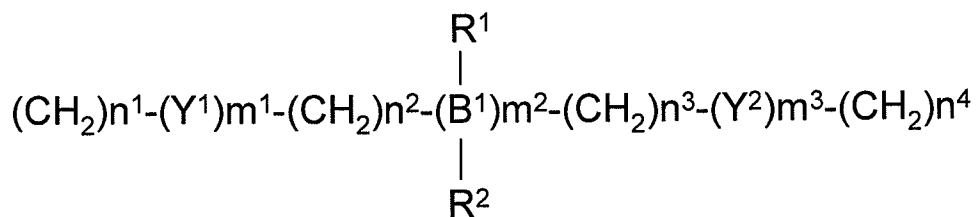
wherein:

P is hydrogen or a polymerizable group which is CH₂=CW-, CH₂=CW-O-,
CH₂=CW-COO-,

wherein:

W is H or CH₃,

Sp has the meaning of formula (III)



(III)

wherein:

Y¹ and Y² each independently represent -OCO- or -COO-,

B¹ represents C or CH,

R¹ is hydrogen,

R^2 represents a methyl, ethyl, propyl, butyl, pentyl or hexyl group
and most preferably a methyl or ethyl group,

n^1, n^2, n^3 and n^4 are independently integers from 0 to 15,

~~such that 0~~ such that $1 \leq n^1 + n^2 + n^3 + n^4 \leq 15$;

with the proviso that

if m^1 is 1 then n^1, n^2 are independently integers from 1 to 15,

if m^3 is 1 then n^3, n^4 are independently integers from 1 to 15;

m^1, m^2 and m^3 are independently integers from ~~0 to 3~~ to 1, such that

$1 \leq m^1 + m^2 + m^3 \leq 3$, and

wherein:

one or more $-\text{CH}_2-$ groups present in the hydrocarbon chain of (III) may be
replaced, independently, by one or more groups selected from $-\text{O}-$, $-\text{CH}=\text{CH}-$ or $-\text{C}\equiv\text{C}-$,

with the proviso that the carbon-carbon double bond of P is not directly connected
to the carbon atom of Y^1 or Y^2 ,

k is 1,

X is $-\text{O}-$, $-\text{CO}-$, $-\text{COO}-$, $-\text{OCO}-$, $-\text{CH}=\text{CH}-$, $-\text{C}\equiv\text{C}-$, or a single bond, more preferably
 $-\text{O}-$, $-\text{COO}-$, $-\text{OCO}-$ or a single bond,

t is 1.

57. (previously presented): A method of using a chiral or achiral rod shaped compound,
comprising preparing a mesogenic polymer mixture as described in claim 47 and having a
transition temperature to the isotropic state of 20 °C or lower.

58. (previously presented): A polymer network prepared from a mixture according to
claim 47.

59. (previously presented): A liquid crystalline polymer film prepared from a mixture according to claim 47.

60. (previously presented): A method of using a polymer network or a liquid crystalline polymer film, comprising preparing unstructured or structured optical and electro-optical components and multilayer systems from (A) a polymer network prepared from a mixture according to claim 47 or (B) a liquid crystalline polymer film prepared from a mixture according to claim 47.

61. (previously presented): A method of using a mesogenic, cross-linkable mixture, comprising preparing an elastomer, polymer gel, polymer network or polymer film from a mesogenic, cross-linkable mixture according to claim 47.

62. (previously presented): A method of using a polymer network, comprising manufacturing waveguides, optical gratings, filters, retarders, polarizers, piezoelectric cells or thin film exhibiting non-linear optical properties from a polymer network according to claim 58.

63. (previously presented): Optical or electro-optical components comprising a polymer network according to claim 58.

64. (previously presented): A method of using a liquid crystalline polymer film, comprising manufacturing waveguides, optical gratings, filters, retarders, polarizers, piezoelectric cells or thin film exhibiting non-linear optical properties from a liquid crystalline polymer film according to claim 59.

65. (previously presented): Optical or electro-optical components comprising a liquid crystalline polymer film according to claim 59.